



December 11, 2018

Ms. Jamie Bernard-Drakey
Site Assessment Manager
U.S. Environmental Protection Agency, Region 7
11201 Renner Boulevard
Lenexa City, Kansas 66219

**Subject: Preliminary Assessment
Shostak Metal Site, Kansas City, Missouri
CERCLIS ID: MON000706450
U.S. EPA Region 7 START, Contract No. EP-S7-13-06, Task Order No. 0104.005
Task Monitor: Jamie Bernard-Drakey, Site Assessment Manager**

Dear Ms. Bernard-Drakey:

Tetra Tech Inc. is submitting the enclosed Preliminary Assessment report regarding the above-referenced site. If you have any questions or comments, please contact the Tetra Tech START Project Manager at (816) 412-1760.

Sincerely,

A handwritten signature in blue ink that reads 'Lauren Holt'.

Lauren Holt
START Project Manager

A handwritten signature in blue ink that reads 'Ted Faile'.

Ted Faile, PG, CHMM
START Program Manager

Enclosures

cc: Debra Dorsey, START Project Officer (cover letter only)

PRELIMINARY ASSESSMENT

**SHOSTAK METAL SITE
KANSAS CITY, MISSOURI**

CERCLIS ID No. MON000706450

**Superfund Technical Assessment and Response Team (START) 4
Contract No. EP-S7-13-06, Task Order 0104, Subtask 005**

Prepared For:

U.S. Environmental Protection Agency
Region 7
11201 Renner Blvd
Lenexa, Kansas 66219

December 11, 2018

Prepared By:

Tetra Tech Inc.
415 Oak Street
Kansas City, Missouri 64106
(816) 412-1741

CONTENTS

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION	1
2.0 SITE CHARACTERISTICS AND PREVIOUS INVESTIGATIONS.....	2
2.1 SITE LOCATION AND DESCRIPTION	2
2.1.1 Geology.....	2
2.1.2 Hydrogeology	3
2.1.3 Hydrology	3
2.2 PREVIOUS INVESTIGATIONS.....	4
3.0 SITE RECONNAISSANCE	5
4.0 HAZARD RANKING SYSTEM FACTORS.....	7
4.1 POTENTIAL SOURCES AND WASTE CHARACTERISTICS.....	7
4.2 GROUNDWATER PATHWAY	7
4.2.1 Hydrogeological Setting	7
4.2.2 Groundwater Targets	7
4.2.3 Groundwater Pathway Conclusions.....	8
4.3 SURFACE WATER PATHWAY	8
4.3.1 Hydrological Setting.....	8
4.3.2 Surface Water Targets	8
4.3.3 Surface Water Pathway Conclusions	8
4.4 SOIL EXPOSURE AND AIR PATHWAYS	8
4.4.1 Physical Conditions	9
4.4.2 Soil and Air Targets.....	9
4.4.3 Soil Exposure and Air Pathway Conclusions	9
5.0 CONCLUSIONS	10
5.1 PRE-REMEDIAL CONSIDERATIONS.....	10
5.2 REMOVAL CONSIDERATIONS	11
6.0 REFERENCES	12

CONTENTS (Continued)

APPENDICES

Appendix

- A FIGURES
- B PREVIOUS INVESTIGATION
- C PHOTOGRAPHIC LOG

1.0 INTRODUCTION

The Tetra Tech, Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) was tasked by the U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division to conduct a Preliminary Assessment (PA) of the former Shostak Metal site (the site) (see Appendix A, Figure 1). Purposes of the preliminary assessment were to evaluate whether any threats to human health or the environment exist because of potential impacts of past activities at the site, and to determine if any removal and remedial response actions are warranted. As part of the preliminary assessment support, START member (SM) Lauren Holt was assigned to conduct a site reconnaissance at the site and present the findings to EPA.

This PA accorded with *Guidance for Performing Preliminary Assessments Under CERCLA* (EPA 1994). Activities completed as part of the PA included reviewing available information about the site and its environs to assess threat(s), if any, posed to public health, welfare, or the environment; determining if further investigation is warranted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) / Superfund Amendments and Reauthorization Act of 1986 (SARA); compiling and evaluating potential targets; and conducting an on-site reconnaissance.

This report summarizes the PA activities described above.

Apparent Problem

In 2001, an article published in the *American Journal of Public Health* titled “Discovering Unrecognized Lead-Smelting Sites by Historical Methods” identified Shostak Metal as a historical secondary lead smelting site that may pose a threat to public health (Eckel, Foster, and Rabinowitz 2001). In 2012, EPA prepared a Pre-Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) screening assessment checklist/decision form regarding the site, determining that the site should be entered into CERCLIS (EPA 2012).

2.0 SITE CHARACTERISTICS AND PREVIOUS INVESTIGATIONS

The site location, description, operational history, waste characteristics, and previous investigations are discussed below.

2.1 SITE LOCATION AND DESCRIPTION

The site is at 303 Broadway Boulevard, Kansas City, Jackson County, Missouri (see Appendix A, Figures 1 and 2). The legal description is within Section 32, Township 50 North, Range 33 West. The site is surrounded by residential and commercial areas, and is centered at 39.108482 degrees north latitude and 94.588144 degrees west longitude. Elevation at the site is approximately 815 feet above mean sea level (Appendix A, Figure 1).

Shostak Metal operated as a junk yard and secondary lead smelter from as early as 1939. Historical documents do not indicate that a stack was used at the site. The site covers approximately 0.41 acre and includes a main building, two attached garages, and a paved parking area. At the time of this site reconnaissance, the property was occupied by the Downtown KC Community Improvement District's sanitation services division as a maintenance and storage facility. Future use of the property is uncertain.

The U.S. Census Bureau (USCB) estimated the population of Kansas City, Missouri at 459,787 in year 2010. Estimated population within Jackson County was 674,158 (USCB 2010). Within a 1-mile radius of the site are 8,398 persons and 5,486 housing units. Population density within the area of the site is 672 persons per square mile. One irrigation well, one heat pump, and 110 groundwater monitoring wells are within a 1-mile radius of the site (Missouri Department of Natural Resources [MDNR] 2018).

Average annual rainfall within Jackson County is approximately 35.75 inches. Of the total annual precipitation, 25 inches, or 70 percent, usually falls from April through September, which includes the growing season for most crops. Thunderstorms can be violent and include strong winds, hail, heavy rain, and tornados. Average seasonal snowfall is 22 inches. Climate conditions in Jackson County generally favor crop production (U.S. Department of Agriculture [USDA] 1984).

2.1.1 Geology

Soil in the area of investigation occurs within moderately sloping areas and is mostly covered (85%) by asphalt, concrete, buildings, or other impervious material. Soil is classified as Urban Land-Upland Complex, which varies in composition because it has been extensively reshaped by cutting and filling.

The Urban Land-Upland soils of Jackson County extend to depths between 3 and 20 feet below ground surface (bgs) (USDA 1984).

The northern extents of Jackson County are within the Dissected Till Plains section of the Central Lowland physiographic province (Miller and Vandike 1997). Underlying surficial soils in the area of the site is more than 50 feet of fine silt and clay loess deposited near the end of the Pleistocene glaciation. Alternating Pennsylvanian limestone and shale strata, indicative of marine transgression-regression sequences, lie beneath the loess deposits and gently dip to the northwest (Hasan, Moberly, and Caoile 1988). The uppermost layers of Pennsylvanian bedrock just south of the Missouri River and in the vicinity of the site belong to the Lower Linn Subgroup of the Kansas City Group, and consist of the Westerville Limestone, Wea Shale, Block Limestone, and Fontana Shale members (U.S. Geological Survey 2004).

2.1.2 Hydrogeology

Jackson County, Missouri is within the West-Central Missouri groundwater province. Groundwater resources of this region are most plentiful in the alluvial deposits of the Kansas and Missouri Rivers. Quaternary alluvium in the area consists of fine-grained silt and clay sediments that grade into coarse to fine sand and silt with depth (Miller and Vandike, 1997).

The site is in the upland areas of Kansas City and sits atop thick loess deposits and Pennsylvanian bedrock above the alluvial valley of the Missouri River. Within these upland areas, unconfined aquifers are at interfaces between loess deposits and glacial lodgement till, and within outwash sands. However, these aquifers are generally low-yielding and of poor quality. Aquifers within the Pennsylvanian bedrock produce groundwater of equally poor quantity and quality, and are characterized by slow recharge rates and high levels of dissolved solids (Hasan, Moberly, and Caoile 1988). Kansas City Public Water Services provides municipal water services to the community from surface intakes along the Missouri River. No municipal or registered domestic wells are within 1 mile of the site.

2.1.3 Hydrology

Based on a review of topographic maps, runoff from the site would follow the general topographic gradient northward toward the Missouri River, which flows west to east from its confluence with the Kansas River 1.25 miles to the west. However, most runoff would likely be captured by stormwater inlets near the site.

2.2 PREVIOUS INVESTIGATIONS

A summary of previous investigations is as follows:

EPA

In 2001, an article published in the *American Journal of Public Health* titled “Discovering Unrecognized Lead-Smelting Sites by Historical Methods” identified Shostak Metal as a historical secondary lead smelting site that may pose a threat to public health (Eckel, Foster, and Rabinowitz 2001). In 2012, EPA prepared a Pre-CERCLIS screening assessment checklist/decision form regarding the site, determining that the site should be entered into CERCLIS (EPA 2012).

UES Consulting Services Inc.

In February 2018, UES Consulting Services, Inc. (UES) completed a Limited Phase II Subsurface Investigation at the request of Anthem Companies to determine if metal contamination from long-term use of the site as a smelter facility had impacted the property. Soil samples were collected at six locations on the subject property and analyzed for metals via EPA Method 6010B/7471A (see Appendix B). Concentrations of contaminants detected in the samples were below MDNR non-residential Risk-Based Target Levels, below natural background levels, or were found in soils collected at locations overlaid by impervious ground cover (concrete). Thus, UES concluded that the metals found in soil posed no risk to health, and that no further action was required (UES 2018).

3.0 SITE RECONNAISSANCE

On April 5, 2018, Tetra Tech START member Lauren Holt and EPA Site Assessment Manager (OSC) Jamie Bernard-Drakey conducted a site reconnaissance in support of this PA to view the site in its current condition and determine possible sampling locations for lead screening of soils. Results of this site reconnaissance were to be used to determine whether additional CERCLA investigations would be warranted at the site. Ms. Bernard-Drakey was not able to obtain access to the site. Therefore, all site reconnaissance activities occurred within public rights-of-way along the outside border of the property. Ms. Holt observed that the property was occupied by the Downtown KC Community Improvement District's sanitation services division as a maintenance and storage facility. Only the following three unpaved areas in the vicinity of the property were identified during the site visit as possible sampling locations due to widespread development of the area: (1) a pet relief area north of the site, (2) a grass-covered area north of the site between the Union Pacific Railroad and Market Station apartments, and (3) a vacant lot southeast of the site (see Appendix A, Figure 2). Photographs of the site and these locations are in Appendix C. Ms. Holt did not see any surface water bodies or exposure pathways, or any other items of concern during the site reconnaissance.

Upon completion of the reconnaissance trip, START reviewed historical aerial images of the site and surrounding areas to determine whether the potential sampling locations identified during the site visit had remained in their original state since the smelter was in operation or if surficial soils within these areas had been displaced by events such as industrial or commercial development. The aerial images (Figure 3 and Figure 4) in Appendix A compare the condition of the site and surrounding area near the time the Shostak smelter was in use to the most current available satellite imagery. The findings of this review are as follows:

- The pet relief area north of the site was graded and sodded between September 2012 and September 2013 during installation of the paved parking lot for the east adjoining apartment structure.
- The grass-covered area between the Union Pacific railroad and Market Station apartments was covered with trees at least as late as September 2014 until removal of these sometime before May 2015.
- The vacant lot southeast of the site was occupied by a structure from as early as 1938. The structure was demolished, and the lot was cleared between 2001 and 2002. Additionally, shortly after the initial site visit, the Planned Industrial Expansion Authority of Kansas City approved plans for the River Market West II Apartment project on the lot. Construction is underway, and completion is expected in December 2019.

Information gathered during this PA indicated that potential soil sampling locations identified during the site reconnaissance would not yield data sufficient to quantify metals contamination in soils associated with historical smelting activities at the site. Because of recent and ongoing expansion of residential and commercial developments in the area surrounding the site, representative samples could not be obtained and EPA decided that soil sampling would not occur as part of this PA.

4.0 HAZARD RANKING SYSTEM FACTORS

The following sections discuss hazard ranking system (HRS) factors.

4.1 POTENTIAL SOURCES AND WASTE CHARACTERISTICS

Soil samples were not collected, as discussed previously in Section 3.

4.2 GROUNDWATER PATHWAY

This section discusses the groundwater pathway.

4.2.1 Hydrogeological Setting

Jackson County, Missouri is within the West-Central Missouri groundwater province. Groundwater resources of this region are most plentiful in the alluvial deposits of the Kansas and Missouri Rivers. Quaternary alluvium in the area consists of fine-grained silt and clay sediments that grade into coarse to fine sand and silt with depth (Miller and Vandike, 1997).

The site is in the upland areas of Kansas City and sits atop thick loess deposits and Pennsylvanian bedrock above the alluvial valley of the Missouri River. Within these upland areas, unconfined aquifers are at interfaces between loess deposits and glacial lodgement till, and within outwash sands. However, these aquifers are generally low-yielding and of poor quality. Aquifers within the Pennsylvanian bedrock produce groundwater of equally poor quantity and quality, and are characterized by slow recharge rates and high levels of dissolved solids (Hasan, Moberly, and Caoile 1988). Kansas City Water Services provides municipal water services to the community from surface intakes along the Missouri River. No registered domestic wells are within a mile of the site.

4.2.2 Groundwater Targets

The site is in the downtown area of Kansas City, Jackson County, Missouri. The area is urban and includes commercial, industrial, and residential spaces. According to the U.S. Census, estimated 2010 population of Kansas City, Missouri was 459,787 (USCB 2010).

According to the Safe Drinking Water Information System, 22 public water systems are within Jackson County, Missouri. Fourteen water systems are supplied by groundwater (EPA 2018). No municipal or registered domestic groundwater wells are within 1 mile of the site.

4.2.3 Groundwater Pathway Conclusions

No groundwater sampling has occurred at the site.

4.3 SURFACE WATER PATHWAY

This section discusses the surface water pathway.

4.3.1 Hydrological Setting

Based on a review of topographic maps, runoff from the site would follow the general topographic gradient northward toward the Missouri River, which flows west to east from its confluence with the Kansas River 1.25 miles to the west. However, most runoff would likely be captured by stormwater inlets near the site.

4.3.2 Surface Water Targets

Eight water systems listed in the Safe Drinking Water Information System (SDWIS) for Jackson County are surface water-based. Kansas City Public Water Services provides municipal water services from surface water intakes along the Missouri River to 460,000 persons in Cass, Clay, Clinton, Jackson, and Platte Counties (EPA 2018).

Threatened or endangered species known or likely to occur in Jackson County, Missouri, include the gray bat, the Indiana bat, the northern long-eared bat, and the pallid sturgeon (U.S. Fish and Wildlife Service [USFWS] 2018). Presence of these species within the site area has not been verified; nor have critical habitat areas been delineated. Recreational fishing likely occurs at the Missouri River, near the site.

4.3.3 Surface Water Pathway Conclusions

No surface water sampling has occurred at the site. The site is within an urban area that has undergone significant commercial and residential redevelopment since smelting activities ceased. Concrete, asphalt, and buildings provide an impervious ground cover on the site and within much of the surrounding area. Most runoff would likely be captured by stormwater inlets near the site.

4.4 SOIL EXPOSURE AND AIR PATHWAYS

This section discusses the soil and air pathways.

4.4.1 Physical Conditions

Soil in the area of the site is within moderately sloping areas and mostly covered (85%) by asphalt, concrete, buildings, or other impervious material. It is classified as Urban Land-Upland Complex, and varies in composition because it has been extensively reshaped by cutting and filling. The Urban Land-Upland soils of Jackson County extend to depths between 3 and 20 feet bgs (USDA 1984).

4.4.2 Soil and Air Targets

The site is in the downtown area of Kansas City, Jackson County, Missouri, an urban area including residential, commercial, and industrial properties. Approximately 8,398 persons and 5,486 housing units are within a 1-mile radius of the site (USCB 2010).

4.4.3 Soil Exposure and Air Pathway Conclusions

Because of recent and ongoing expansion of residential and commercial developments in the area surrounding the site, EPA decided that soil sampling would not occur because such samples would not likely yield data sufficient to quantify metals contamination associated with historical smelting activities. Results of soil sampling completed by UES in February 2018 indicated that concentrations of contaminants were below MDNR non-residential Risk-Based Target Levels, below natural background levels, or detected in soil samples collected at locations overlaid by impervious ground cover (UES 2018).

No air sampling has occurred at the site.

5.0 CONCLUSIONS

In 2001, an article published in the *American Journal of Public Health* titled “Discovering Unrecognized Lead-Smelting Sites by Historical Methods” identified Shostak Metal as a historical secondary lead smelting site that may pose a threat to public health. In 2012, EPA prepared a Pre-CERCLIS screening assessment checklist/decision form regarding the site, determining that the site should be entered into CERCLIS.

In February 2018, UES completed a Limited Phase II Subsurface Investigation at the request of Anthem Companies to determine if metal contamination from long-term use of the site as a smelter facility had impacted the property. Concentrations of contaminants detected in the samples were below MDNR non-residential Risk-Based Target Levels, below natural background levels, or were detected in soils collected at locations overlaid by impervious ground cover.

On April 5, 2018, START and EPA conducted a site reconnaissance to view the site in its current condition, evaluate migration pathways, and determine sampling locations. Access to the site was not obtained; therefore, all site reconnaissance activities occurred from the road and along public rights-of-way. The site reconnaissance did not identify any signs of historical smelting operations.

START and EPA determined that potential soil sampling locations identified during the reconnaissance would not yield data sufficient to quantify metals contamination in soils associated with historical smelting activities due to recent and ongoing expansion of residential and commercial developments in the area surrounding the site.

Findings of the PA revealed that historical use of the site as a secondary smelter does not present a risk to human health or the environment in its current state because of low probability of exposure to contaminants. As a result, further CERCLA investigation of the site is not warranted.

5.1 PRE-REMEDIAL CONSIDERATIONS

Based on findings from the PA, it does not appear that historical secondary smelting operations at the site present a risk to human health or the environment in its current state; therefore, additional CERCLA investigations do not appear warranted.

5.2 REMOVAL CONSIDERATIONS

Based on the findings from the PA (and previous investigations at the site), historical secondary smelting operations at the site do not present a risk to human health or the environment in its current state. Based on the findings of this PA, no removal activities appear warranted.

6.0 REFERENCES

- Eckel, W. P., G.D. Foster, and M.B. Rabinowitz. 2001. "Discovering Unrecognized Lead-Smelting Sites by Historical Methods." *American Journal of Public Health*, 91(4): 625-627. doi: 10.2105/AJPH.91.4.625.
- Hasan, S.E., R.L. Moberly, and J.A. Caoile. 1988. "Geology of Greater Kansas City, Missouri and Kansas, United States of America." *Bulletin of the Association of Engineering Geologists*. XXV(3): 281-341. doi: 10.2113/gsegeosci.xxv.3.277.
- Miller, D.E. and J.E. Vandike. 1997. Groundwater Resources of Missouri. Missouri State Water Plan Series Volume II. Missouri Department of Natural Resources (MDNR) Division of Geology and Land Survey, Water Resources Report No. 46.
- Missouri Department of Natural Resources (MDNR). 2018. *Map of Wells in Jackson County, Missouri*. Missouri Geological Survey Geosciences Technical Resource Assessment Tool. Accessed November 2018. http://www.dnr.mo.gov/gis/GeoStrat/Groundwater_Depth.kmz
- UES Consulting Services, Inc. (UES). 2018. Limited Phase II Subsurface Investigation at 303 Broadway Kansas City, Missouri 64105. March 23.
- U.S. Census Bureau (USCB). 2010. 2010 Census Interactive Population Search. American FactFinder. https://factfinder.census.gov/faces/nav/jsf/pages/guided_search.xhtml
- U.S. Department of Agriculture (USDA). 1984. Soil Survey of Jackson County, Missouri.
- U.S. Environmental Protection Agency (EPA). 1994. *Guidance for Performing Preliminary Assessments Under CERCLA*. Office of Solid Waste and Emergency Response (OSWER) 9345.0 01A. September.
- EPA. 2012. Pre-CERCLIS Screening Assessment Checklist/Decision Form. May 11.
- EPA. 2018. Safe Drinking Water Information System (SDWIS). List of water systems for Jackson County, Missouri. http://oaspub.epa.gov/enviro/sdw_query_v2.get_list?wsys_name=&fac_search=fac_beginning&fac_county=OTTAWA&pop_serv=500&pop_serv=3300&pop_serv=10000&pop_serv=100000&pop_serv=100001&sys_status=active&pop_serv=&wsys_id=&fac_state=KS&last_fac_name=&page=1&query_results=&total_rows_found=
- U.S. Fish and Wildlife Service (USFWS). 2018. Jackson-County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species. Accessed November 30, 2018. Last updated November 30, 2018. <https://ecos.fws.gov/ipac/location/LKKL7BS2EFEIZBQETH7R6EIIPQ/resources>
- U.S. Geological Survey. 2004. Geologic Map of the Missouri Part of the Kansas City MO-KS 7.5' Quadrangle, Jackson County, Missouri. Accessed November 2018. https://ngmdb.usgs.gov/Prodesc/proddesc_79286.htm

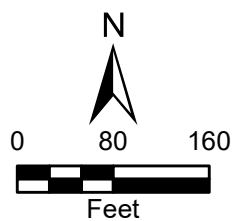
APPENDIX A

FIGURES



Legend

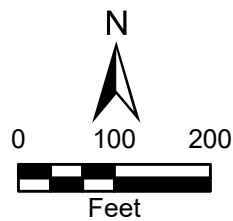
- Approximate site boundary
- Potential sampling area identified during initial site visit



Shostak Metal
303 Broadway
Kansas City, Missouri

Figure 2
Site Layout Map





Shostak Metal
303 Broadway
Kansas City, Missouri

Figure 3
1955 Aerial



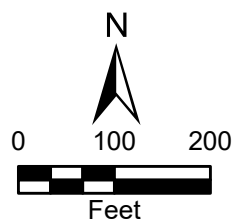
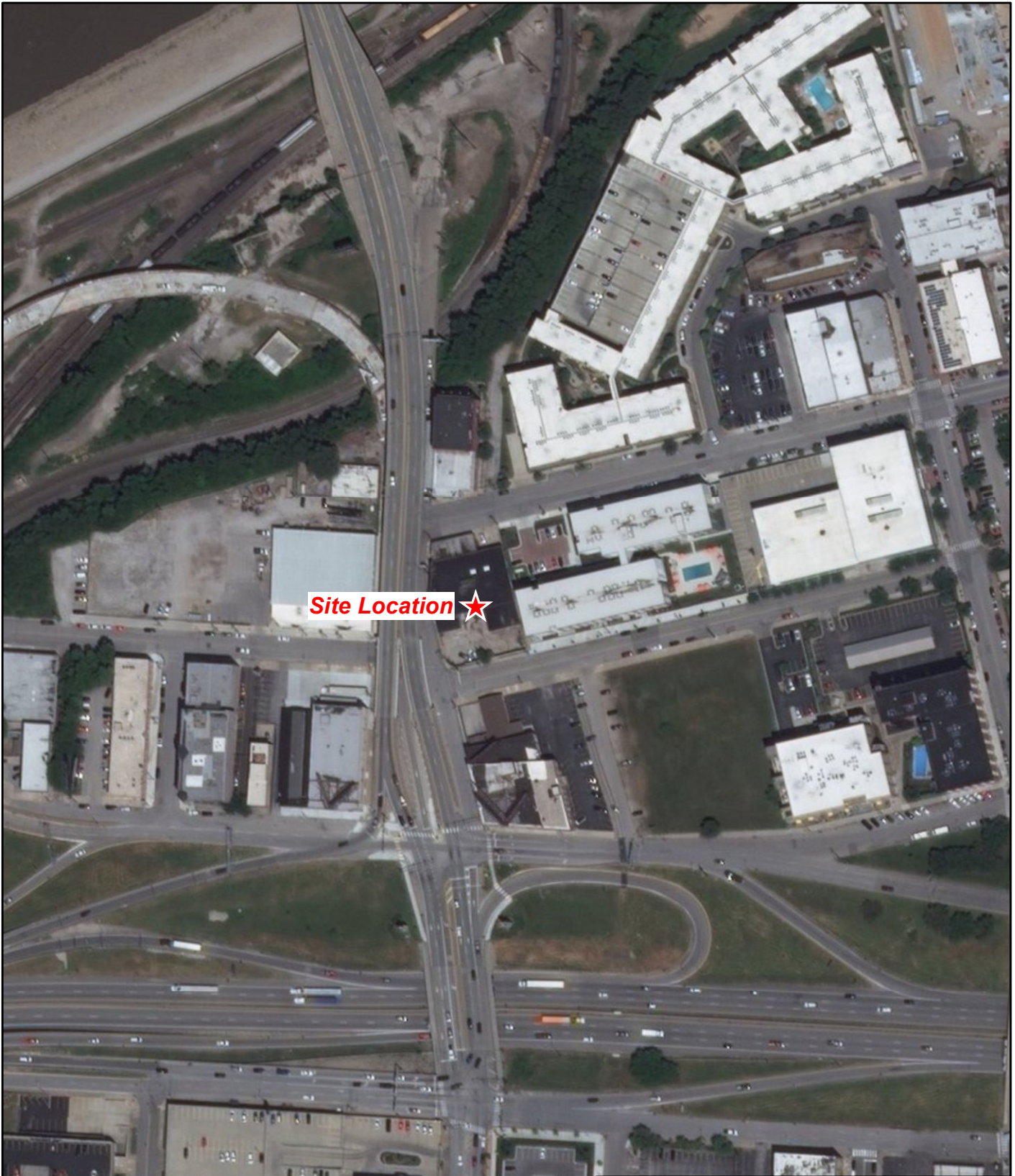
Source: Esri, World Imagery, 2017 Aerial Image

Date: 11/8/2018

Drawn By: Nick Wiederholt

Project No: X9025.16.0104.005

X:\G002510104\005\Projects\mxd\Figure3_1955_Aerial.mxd



Shostak Metal
303 Broadway
Kansas City, Missouri

Figure 4
2017 Aerial



Source: Esri, World Imagery, 2017 Aerial Image

Date: 11/8/2018

Drawn By: Nick Wiederholt

Project No: X9025.16.0104.005

X:\G002510104\005\Projects\mxd\Figure4_2017_Aerial.mxd

APPENDIX B
PREVIOUS INVESTIGATION



**LIMITED PHASE II
SUBSURFACE INVESTIGATION**

**303 Broadway
Kansas City, Jackson County, Missouri 64105**

Date Issued: March 23, 2018

Project Number: 3519.18

Prepared by:

**UES CONSULTING SERVICES, INC.
100 East 7th Street
Suite 200
Kansas City, Missouri 64106
816.221.0627**



March 23, 2018

Anthem Companies
412 A Delaware Street
Kansas City, Missouri 64105

RE: Limited Phase II Subsurface Investigation
303 Broadway
Kansas City, Missouri 69101

UES Consulting Services is pleased to submit the enclosed Limited Phase II Subsurface Investigation report performed on the above-referenced subject property.

Thank you for the opportunity to be of service. Should you have any questions, please feel free to contact our office.

Sincerely,

UES CONSULTING SERVICES, INC.

Samuel E. Petrie, P.E.
Environmental Professional

Ed Taylor
Environmental Professional
CEO

TABLE OF CONTENTS

	<u>Page</u>
EXECUTIVE SUMMARY	1
1.0 INTRODUCTION	2
2.0 BACKGROUND INFORMATION	3
3.0 PHASE II ACTIVITIES	4
4.0 EVALUATION OF RESULTS	5
5.0 CONCLUSIONS	6
6.0 REFERENCES	7

APPENDICES

- A. Soil Sample Tables
- B. Laboratory Analytical Data
- C. Boring Logs
- D. Resume

FIGURES

- 1. Site Diagram

EXECUTIVE SUMMARY

The subject property, located at 303 Broadway, Kansas City, Jackson County, Missouri, was investigated on February 18, 2018. The purpose of the Phase II investigation was to determine if metal contamination from the long term use of the subject property as a smelter has impacted the property.

Soil sample B1 laboratory analytical data showed arsenic at 6.48 mg/kg; barium at 156 mg/kg; cadmium at 0.306 J mg/kg; chromium at 18.9 mg/kg; lead at 10.5 mg/kg and mercury at 0.0266 mg/kg. Sample B2 contained arsenic at 4.93 mg/kg; barium at 209 mg/kg; cadmium at 0.291 mg/kg; chromium at 18.5 mg/kg; lead at 14.9 mg/kg and mercury at 0.0342 mg/kg. Sample B3 contained arsenic at 6.77 mg/kg; barium at 226 mg/kg; cadmium at 0.805 mg/kg; chromium at 16.0 mg/kg; lead at 76.6 mg/kg and mercury at 1.48 mg/kg. Sample B4 contained arsenic at 8.72 mg/kg; barium at 644 mg/kg; cadmium at 16.2 mg/kg; chromium at 24.5 mg/kg; lead at 1190 mg/kg and mercury at 0.863 mg/kg. Sample B5 contained arsenic at 6.40 mg/kg; barium at 129 mg/kg; cadmium at 0.203 J mg/kg; chromium at 18.6 mg/kg; lead at 10.2 mg/kg and mercury at 0.204 J mg/kg. Sample B6 contained arsenic at 7.21 mg/kg; barium at 174 mg/kg; cadmium at 0.957 mg/kg; chromium at 18.5 mg/kg; lead at 328 mg/kg and mercury at 1.79 mg/kg. **The metals concentrations from sample B1 through B3; B5; and B6 were below the MDNR non-residential RBTLS. Sample B4 showed lead above non-residential levels, which appears to be contributed to brick debris and other building debris.**

The Phase II has confirmed the metals detected in the soil on the subject property are below the Missouri Department of Natural Resources (MDNR) non-residential RBTLS and/or natural background levels. Note, B4 is covered by impervious cover (concrete), in addition to be covered by fill material greater than 3 feet. Therefore, the metals levels found in the soil does not pose any health risks, and no further action is required.

1.0 INTRODUCTION

1.1 Purpose

The Phase II was conducted in accordance with the request by the client.

The Phase II was performed in conformity with ASTM Standard E1903 - 11. The purpose of the Phase II report is to provide useful, decision-making information regarding the findings of the soil and groundwater sampling at the subject property for potential environmental conditions. The report and the information contained herein is intended to be utilized by and may be relied upon by Anthem Companies, including their successors and assigns.

1.2 Special Terms and Conditions

No special terms or conditions are noted.

1.3 Limitations and Exceptions of Assessment

No limitations or exceptions are noted.

1.4 Limiting Conditions and Methodology Used

The Phase II investigation of the subject property consisted of soil and groundwater sampling derived from six (6) borings. A site diagram is included in Figure 1. Soil samples were obtained from borings B1 through B6. The Samples were delivered to the laboratory for analysis as discussed below.

Soil samples were analyzed for metals by EPA Method 6010B/7471A.

2.0 BACKGROUND INFORMATION

2.1 Site Description

The parcel at 303 Broadway includes a two-story brick veneer and concrete block auto repair shop and office building, constructed in 1948, containing approximately 12,437 square feet. The subject property also includes an enclosed car lot on the south side of the building.

2.2 Physical Setting

A complete description of the physical setting of the subject property is included in the Phase I Environmental Site Assessments by UES Consulting Services, Inc. dated April 7, 2014, and is in the possession of Anthem Companies, its successors and assigns.

2.3 Site History and Land Use

A complete description of the site history and land use of the subject property is included in the Phase I Environmental Site Assessments by UES Consulting Services, Inc. dated April 7, 2014, and is in the possession of Anthem Companies, its successors and assigns.

2.4 Adjacent Property Land Use

A complete description of the adjacent property land use is included in the Phase I Environmental Site Assessments by UES Consulting Services, Inc. dated April 7, 2014, and is in the possession of Anthem Companies, its successors and assigns.

2.2 Summary of Previous Assessments

One prior Phase I Environmental Site Assessment (ESA) report by UES Consulting Services, Inc. dated April 7, 2014.

3.0 PHASE II ACTIVITIES

3.1 Scope of Assessment

The Phase II was performed in conformity with the ASTM Standard E1903 - 11. Authorization to conduct the Phase II was provided by Anthem Companies, its successors and assigns to UES Consulting Services in February 2018.

3.2 Field Explorations and Methods

UES Consulting Services mobilized to the subject property and collected samples from six (6) surficial and/or subsurface soil borings. A boring location map is included in Figure 1. The borings were completed in the areas identified as having the highest probability of adverse environmental impact. The subsurface samples were collected at the following locations:

- Borings B1 through B6 were located on the subject property in areas potentially impacted by contamination.

The subsurface borings were completed as follows from client provided drilling firm:

- A truck-mounted CME drill rig was used to auger to a depth of 3 to 10 feet below land surface (ft bls). The soil samples were collected using clean hand auger following using the truck mounted unit to auger through fill material to obtain soil samples. Note, interior soil samples were collected using hand auger following drilling through concrete slab. Standard Operating Procedure for soil sampling were utilized during sampling activities. The work was completed under the direct supervision of a qualified well installer and a geologist or an engineer.
- Soil samples were collected for purposes of logging the borings according to the Unified Soil Classification System and for collecting the samples for laboratory analysis. Soil sample information was entered by a technically qualified person to log, identify, and classify soil cores. Accurate field log notes will be kept for each location.
- Samples were placed in certified chemically clean, glass sample jars. The sample jars were placed in a cooler on ice for possible transfer to a laboratory for chemical analysis. Each sample container was identified by the sample location, the time the sample was taken, the sampler, and the interval from which the sample was taken. All sampling equipment and materials were cleaned between sampling events or disposed of in the case of gloves, sample tubes, scoops, and other one time materials.

Six (6) soil samples were analyzed for metals by EPA Method 6010B/7471A.

4.0 EVALUATION OF RESULTS

4.1 Soil Chemical Data

Six (6) soil samples were obtained at the approximate depth of 1 to 2 feet from B5, 1 to 3 feet from B6, 3 to 5 feet from B4, 6 to 8 feet from B2, and 7 to 9 feet from B1 and B3.

Soil sample B1 laboratory analytical data showed arsenic at 6.48 mg/kg; barium at 156 mg/kg; cadmium at 0.306 J mg/kg; chromium at 18.9 mg/kg; lead at 10.5 mg/kg and mercury at 0.0266 mg/kg. Sample B2 contained arsenic at 4.93 mg/kg; barium at 209 mg/kg; cadmium at 0.291 mg/kg; chromium at 18.5 mg/kg; lead at 14.9 mg/kg and mercury at 0.0342 mg/kg. Sample B3 contained arsenic at 6.77 mg/kg; barium at 226 mg//kg; cadmium at 0.805 mg/kg; chromium at 16.0 mg/kg; lead at 76.6 mg/kg and mercury at 1.48 mg/kg. Sample B4 contained arsenic at 8.72 barium at 644 mg/kg; cadmium at 16.2 mg/kg; chromium at 24.5 mg/kg; lead at 1190 mg/kg and mercury at 0.863 mg/kg. Sample B5 contained arsenic at 6.40 mg/kg; barium at 129 mg/kg; cadmium at 0.203 J mg/kg; chromium at 18.6 mg/kg; lead at 10.2 mg/kg and mercury at 0.204 J mg/kg. Sample B6 contained arsenic at 7.21 mg/kg; barium at 174 mg/kg; cadmium at 0.957 mg/kg; chromium at 18.5 mg/kg; lead at 328 mg/kg and mercury at 1.79 mg/kg.

5.0 CONCLUSIONS

5.1 Statement of Conclusion

The Phase II was conducted in substantive accordance with the guidance contained in the ASTM Standard E1903 - 11, and in accordance with the description of work to be performed. Conclusions reached as a result of the Phase II are summarized as follows:

The Phase II has confirmed the contamination detected in the soil on the subject property is below the Missouri Department of Natural Resources (MDNR) non-residential RBTLS, natural background levels, and/or covered by impervious cover (concrete). Therefore, the contamination levels found in the soil does not pose any health risks, and no further action is required.

5.2 Professional Opinion

The Phase II has been performed in conformance with the terms and conditions of the agreement between UES Consulting Services, Inc. and Anthem Companies, its successors and assigns and the scope of work with respect to certain real property located at 303 Broadway, Kansas City, Jackson County, Missouri. No exceptions to, or deletions from, this practice as described above are noted.

It is our professional judgment that metal substances are present on the subject property below MDNR non-residential RBTLS and/or natural background levels. Note, B4 is covered by impervious cover (concrete), in addition to be covered by fill material greater than 3 feet in the subsurface areas sampled.

5.3 General Comments

This report is based upon data obtained from the borings noted as sampled in this report. This report does not reflect any lateral variations of subsurface soil horizons whether naturally occurring or manmade. The extent of any variations may not become evident without further investigation or completion of a remedial plan. If variations occur, it could substantially change any conclusions or recommendations made in this report. There is no guarantee that contamination above acceptable levels will not exist in those areas that were not sampled. This report is prepared for the exclusive use of our client. No other warranty, expressed or implied is made. Any changes in plume depiction could substantially change any conclusions or recommendations made in this report. UES Consulting Services, Inc. does not warrant the work of regulatory agencies or third parties supplying information used in compiling this report.

6.0 REFERENCES

1. ASTM E-1527-13 Phase I Environmental Site Assessment of 303 Broadway, Kansas City, Jackson County, Missouri, prepared by UES Consulting Services, Inc. (April 7, 2014).
2. Missouri Department of Natural Resources Risk-Based Screening Levels for Soil and Groundwater.

Appendix A

Table 1
Surficial Soil Sampling Laboratory Results

Sample ID	Date	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)
B5 (1-2')	3/13/2018	6.40	129	0.203 J	18.6	10.2	0.0204 J	ND (2.44)	ND (1.22)
B6 (1-3')	3/13/2018	7.21	174	0.957	18.5	328	1.79	ND (2.46)	ND (1.23)
EPA Method		6010	6010	6010	6010	6010	7471	6010	6010
Missouri Non-Residential RBTLs**		1.59E+01	1.81E+05	7.48E+01	4.72E+05	6.60E+02	6.30E+02	4.78E+03	4.48E+02
Element Background Concentrations***		1.6 - 26	7.00E+02	NA	7.00E+01	30 to 300	0.082	0.5 to 2	NA

ND = None Detected (for analytical data, the quantitation limit is in parentheses)

J = Estimated Value

NT = Not Tested

* Missouri Default Target Levels (DTLs) from Table B-1.

** Missouri Risk Based Corrective Action - Tables B-2 & B-5 Risk Based Target Levels (RBTLs) - June 2006

*** Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States.

Additional Results

Table 2
Subsurface Soil Sampling Laboratory Results

Sample ID	Date	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)
B1 (7-9')	3/13/2018	6.48	156	0.306 J	18.9	10.5	0.0266	ND (2.44)	ND (1.22)
B2 (6-8')	3/13/2018	4.93	209	0.291	18.5	14.9	0.0342	ND (2.51)	ND (1.26)
B3 (7-9')	3/13/2018	6.77	226	0.805	16.0	76.6	1.48	ND (2.52)	ND (1.26)
B4 (3-5')	3/13/2018	8.72	644	16.2	24.5	1190*	0.863	ND (2.34)	ND (1.17)
EPA Method		6010	6010	6010	6010	6010	7471	6010	6010
Missouri Non-Residential RBTLS**		NA	NA	NA	NA	6.60E+02	NA	NA	NA
Element Background Concentrations***		1.6 - 26	7.00E+02	NA	7.00E+01	30 to 300	0.082	0.5 to 2	NA

ND = None Detected (for analytical data, the quantitation limit is in parentheses)

J = Estimated Value

NT = Not Tested

* - Value may be due to brick debris located in bore hole.

** Missouri Risk Based Corrective Action - Tables B-2 & B-5 Risk Based Target Levels (RBTLS) - June 2006

*** Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States.

Additional Results

Appendix B

March 16, 2018

UES Consulting Service, Inc.

Sample Delivery Group: L977312
Samples Received: 03/14/2018
Project Number: Broadway
Description: 303 Broadway

Report To: Sam Petrie
100 East 7th Street; Ste 200
Kansas City, MO 64106

Entire Report Reviewed By:



Jeff Carr

Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

ONE LAB. NATIONWIDE.



Cp: Cover Page	1
Tc: Table of Contents	2
Ss: Sample Summary	3
Cn: Case Narrative	4
Sr: Sample Results	5
B1 (7-9) L977312-01	5
B2 (6-8) L977312-02	6
B3 (7-9) L977312-03	7
B4 (3-5) L977312-04	8
B5 (1-2) L977312-05	9
B6 (1-3) L977312-06	10
Qc: Quality Control Summary	11
Total Solids by Method 2540 G-2011	11
Mercury by Method 7471A	12
Metals (ICP) by Method 6010B	13
Gl: Glossary of Terms	14
Al: Accreditations & Locations	15
Sc: Sample Chain of Custody	16



SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



B1 (7-9) L977312-01 Solid

Collected by: Jim B
Collected date/time: 03/13/18 09:24
Received date/time: 03/14/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1084551	1	03/15/18 10:10	03/15/18 10:17	KDW
Mercury by Method 7471A	WG1084711	1	03/14/18 19:14	03/15/18 12:44	EL
Metals (ICP) by Method 6010B	WG1084686	1	03/14/18 18:16	03/15/18 13:38	ST



B2 (6-8) L977312-02 Solid

Collected by: Jim B
Collected date/time: 03/13/18 09:57
Received date/time: 03/14/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1084551	1	03/15/18 10:10	03/15/18 10:17	KDW
Mercury by Method 7471A	WG1084711	1	03/14/18 19:14	03/15/18 12:46	EL
Metals (ICP) by Method 6010B	WG1084686	1	03/14/18 18:16	03/15/18 14:15	ST



B3 (7-9) L977312-03 Solid

Collected by: Jim B
Collected date/time: 03/13/18 10:21
Received date/time: 03/14/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1084551	1	03/15/18 10:10	03/15/18 10:17	KDW
Mercury by Method 7471A	WG1084711	2	03/14/18 19:14	03/15/18 13:02	EL
Metals (ICP) by Method 6010B	WG1084686	1	03/14/18 18:16	03/15/18 14:18	ST



B4 (3-5) L977312-04 Solid

Collected by: Jim B
Collected date/time: 03/13/18 10:59
Received date/time: 03/14/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1084551	1	03/15/18 10:10	03/15/18 10:17	KDW
Mercury by Method 7471A	WG1084711	1	03/14/18 19:14	03/15/18 12:51	EL
Metals (ICP) by Method 6010B	WG1084686	1	03/14/18 18:16	03/15/18 14:20	ST

B5 (1-2) L977312-05 Solid

Collected by: Jim B
Collected date/time: 03/13/18 11:18
Received date/time: 03/14/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1084551	1	03/15/18 10:10	03/15/18 10:17	KDW
Mercury by Method 7471A	WG1084711	1	03/14/18 19:14	03/15/18 12:54	EL
Metals (ICP) by Method 6010B	WG1084686	1	03/14/18 18:16	03/15/18 14:23	ST

B6 (1-3) L977312-06 Solid

Collected by: Jim B
Collected date/time: 03/13/18 11:37
Received date/time: 03/14/18 14:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1084551	1	03/15/18 10:10	03/15/18 10:17	KDW
Mercury by Method 7471A	WG1084711	2	03/14/18 19:14	03/15/18 13:09	EL
Metals (ICP) by Method 6010B	WG1084686	1	03/14/18 18:16	03/15/18 14:30	ST



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jeff Carr
Technical Service Representative



B1 (7-9)

Collected date/time: 03/13/18 09:24

SAMPLE RESULTS - 01

L977312

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	82.1		1	03/15/2018 10:17	WG1084551

Mercury by Method 7471A

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0266	<u>B</u>	0.00341	0.0244	1	03/15/2018 12:44	WG1084711

Metals (ICP) by Method 6010B

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Arsenic	6.48		0.792	2.44	1	03/15/2018 13:38	WG1084686
Barium	156		0.207	0.609	1	03/15/2018 13:38	WG1084686
Cadmium	0.306	<u>U</u>	0.0853	0.609	1	03/15/2018 13:38	WG1084686
Chromium	18.9		0.171	1.22	1	03/15/2018 13:38	WG1084686
Lead	10.5		0.232	0.609	1	03/15/2018 13:38	WG1084686
Selenium	U		0.902	2.44	1	03/15/2018 13:38	WG1084686
Silver	U		0.341	1.22	1	03/15/2018 13:38	WG1084686



B2 (6-8)

Collected date/time: 03/13/18 09:57

SAMPLE RESULTS - 02

L977312

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	79.6		1	03/15/2018 10:17	WG1084551

Mercury by Method 7471A

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0342	<u>B</u>	0.00352	0.0251	1	03/15/2018 12:46	WG1084711

Metals (ICP) by Method 6010B

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Arsenic	4.93		0.816	2.51	1	03/15/2018 14:15	WG1084686
Barium	209		0.213	0.628	1	03/15/2018 14:15	WG1084686
Cadmium	0.291	<u>J</u>	0.0879	0.628	1	03/15/2018 14:15	WG1084686
Chromium	18.5		0.176	1.26	1	03/15/2018 14:15	WG1084686
Lead	14.9		0.239	0.628	1	03/15/2018 14:15	WG1084686
Selenium	U		0.929	2.51	1	03/15/2018 14:15	WG1084686
Silver	U		0.352	1.26	1	03/15/2018 14:15	WG1084686



B3 (7-9)

Collected date/time: 03/13/18 10:21

SAMPLE RESULTS - 03

L977312

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	79.3		1	03/15/2018 10:17	WG1084551

Mercury by Method 7471A

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Mercury	1.48		0.00706	0.0504	2	03/15/2018 13:02	WG1084711

Metals (ICP) by Method 6010B

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Arsenic	6.77		0.819	2.52	1	03/15/2018 14:18	WG1084686
Barium	226		0.214	0.630	1	03/15/2018 14:18	WG1084686
Cadmium	0.805		0.0882	0.630	1	03/15/2018 14:18	WG1084686
Chromium	16.0		0.176	1.26	1	03/15/2018 14:18	WG1084686
Lead	76.6		0.239	0.630	1	03/15/2018 14:18	WG1084686
Selenium	U		0.933	2.52	1	03/15/2018 14:18	WG1084686
Silver	U		0.353	1.26	1	03/15/2018 14:18	WG1084686



B4 (3-5)

Collected date/time: 03/13/18 10:59

SAMPLE RESULTS - 04

L977312

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	85.5		1	03/15/2018 10:17	WG1084551

Mercury by Method 7471A

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Mercury	0.863		0.00328	0.0234	1	03/15/2018 12:51	WG1084711

Metals (ICP) by Method 6010B

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Arsenic	8.72		0.760	2.34	1	03/15/2018 14:20	WG1084686
Barium	644		0.199	0.585	1	03/15/2018 14:20	WG1084686
Cadmium	16.2		0.0819	0.585	1	03/15/2018 14:20	WG1084686
Chromium	24.5		0.164	1.17	1	03/15/2018 14:20	WG1084686
Lead	1190		0.222	0.585	1	03/15/2018 14:20	WG1084686
Selenium	U		0.866	2.34	1	03/15/2018 14:20	WG1084686
Silver	U		0.328	1.17	1	03/15/2018 14:20	WG1084686



B5 (1-2)

Collected date/time: 03/13/18 11:18

SAMPLE RESULTS - 05

L977312

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	81.9		1	03/15/2018 10:17	WG1084551

Mercury by Method 7471A

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0204	BJ	0.00342	0.0244	1	03/15/2018 12:54	WG1084711

Metals (ICP) by Method 6010B

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Arsenic	6.40		0.794	2.44	1	03/15/2018 14:23	WG1084686
Barium	129		0.208	0.611	1	03/15/2018 14:23	WG1084686
Cadmium	0.203	J	0.0855	0.611	1	03/15/2018 14:23	WG1084686
Chromium	18.6		0.171	1.22	1	03/15/2018 14:23	WG1084686
Lead	10.2		0.232	0.611	1	03/15/2018 14:23	WG1084686
Selenium	U		0.904	2.44	1	03/15/2018 14:23	WG1084686
Silver	U		0.342	1.22	1	03/15/2018 14:23	WG1084686



B6 (1-3)

Collected date/time: 03/13/18 11:37

SAMPLE RESULTS - 06

L977312

ONE LAB. NATIONWIDE.



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	81.3		1	03/15/2018 10:17	WG1084551

Mercury by Method 7471A

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Mercury	1.79		0.00689	0.0492	2	03/15/2018 13:09	WG1084711

Metals (ICP) by Method 6010B

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Arsenic	7.21		0.799	2.46	1	03/15/2018 14:30	WG1084686
Barium	174		0.209	0.615	1	03/15/2018 14:30	WG1084686
Cadmium	0.957		0.0861	0.615	1	03/15/2018 14:30	WG1084686
Chromium	18.5		0.172	1.23	1	03/15/2018 14:30	WG1084686
Lead	328		0.234	0.615	1	03/15/2018 14:30	WG1084686
Selenium	U		0.910	2.46	1	03/15/2018 14:30	WG1084686
Silver	U		0.344	1.23	1	03/15/2018 14:30	WG1084686



WG1084551

Total Solids by Method 2540 G-2011

QUALITY CONTROL SUMMARY

[L977312-01,02,03,04,05,06](#)

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3293727-1 03/15/18 10:17

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Total Solids	%		%	%
	0.00100			

L977312-01 Original Sample (OS) • Duplicate (DUP)

(OS) L977312-01 03/15/18 10:17 • (DUP) R3293727-3 03/15/18 10:17

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Total Solids	%	%		%		%
	82.1	81.9	1	0.183		5

Laboratory Control Sample (LCS)

(LCS) R3293727-2 03/15/18 10:17

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Total Solids	%	%	%	%	
	50.0	50.0	100	85.0-115	



WG1084711

Mercury by Method 7471A

QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.


[L977312-01,02,03,04,05,06](#)

Method Blank (MB)

(MB) R3293504-1 03/15/18 12:08

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Mercury	0.00307	J	0.00280	0.0200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3293504-5 03/15/18 12:59 • (LCSD) R3293504-2 03/15/18 12:13

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.300	0.334	0.320	111	107	80.0-120			4.24	20

L977249-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L977249-01 03/15/18 12:16 • (MS) R3293504-3 03/15/18 12:18 • (MSD) R3293504-4 03/15/18 12:21

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.300	0.150	0.431	0.412	93.7	87.6	1	75.0-125			4.36	20



WG1084686

Metals (ICP) by Method 6010B

QUALITY CONTROL SUMMARY

ONE LAB. NATIONWIDE.



Method Blank (MB)

(MB) R3293670-1 03/15/18 13:31

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.650	2.00
Barium	U		0.170	0.500
Cadmium	U		0.0700	0.500
Chromium	0.148	J	0.140	1.00
Lead	U		0.190	0.500
Selenium	U		0.740	2.00
Silver	U		0.280	1.00

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

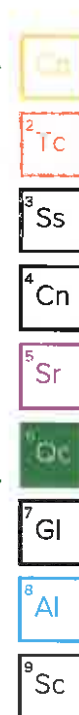
(LCS) R3293670-2 03/15/18 13:33 • (LCSD) R3293670-3 03/15/18 13:36

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Arsenic	100	101	97.8	101	97.8	80.0-120			2.75	20
Barium	100	105	103	105	103	80.0-120			2.18	20
Cadmium	100	100	98.1	100	98.1	80.0-120			2.22	20
Chromium	100	102	99.6	102	99.6	80.0-120			2.50	20
Lead	100	102	100	102	100	80.0-120			2.21	20
Selenium	100	100	97.8	100	97.8	80.0-120			2.34	20
Silver	20.0	18.2	17.7	91.0	88.6	80.0-120			2.67	20

L977312-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L977312-01 03/15/18 13:38 • (MS) R3293670-6 03/15/18 13:45 • (MSD) R3293670-7 03/15/18 13:48

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Arsenic	122	6.48	118	119	91.8	92.5	1	75.0-125			0.619	20
Barium	122	156	267	296	91.3	115	1	75.0-125			10.2	20
Cadmium	122	0.306	114	114	93.1	93.3	1	75.0-125			0.123	20
Chromium	122	18.9	132	132	92.7	92.6	1	75.0-125			0.0532	20
Lead	122	10.5	130	131	97.7	98.6	1	75.0-125			0.813	20
Selenium	122	U	110	111	90.5	90.7	1	75.0-125			0.220	20
Silver	24.4	U	20.1	20.1	82.3	82.6	1	75.0-125			0.417	20





Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
MDL (dry)	Method Detection Limit.
RDL	Reported Detection Limit.
RDL (dry)	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.



ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey-NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio-VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana ¹	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

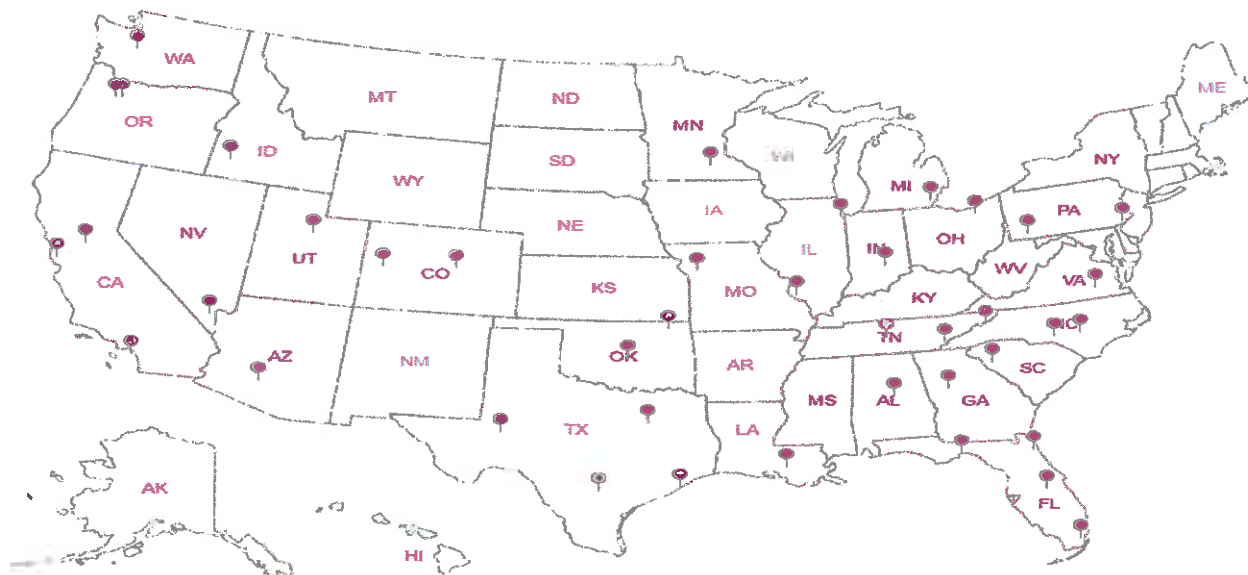
Third Party Federal Accreditations

A2LA - ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA - ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



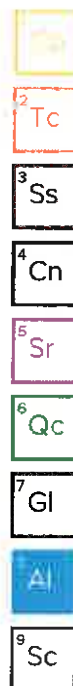
ACCOUNT:
UES Consulting Service, Inc.

PROJECT:
Broadway

SDG:
L977312

DATE/TIME:
03/16/18 11:37

PAGE:
15 of 16



UES Consulting Services
100 E 7th Street, Suite 200
Kansas City, MO 64106

Handwritten: **Need Results by Friday 3/10/18**

Account for
Sam Perle

Email to
sam@uesconsulting.com

Address
303 Broadway

City/State
Kansas City, Mo.

Phone
816-221-0627

Client Project #

Lab Project #

Collected by
JMB

Site/Facility ID #

P.O. #

Collector's signature
JMB

Rush? (Lab MUST be notified)

Quote #

Transportation
Packed in ice **N** **X**

Same Day ☐ Five Day ☐
Next Day ☐ 5 Day (Mon-Fri) ☐
Two Day ☐ 20 Day (Mon-Fri) ☐
Three Day ☐

Date Results Needed

Qty of
Cds

Handwritten: **RETRACTED**

Sample ID	Comp/Grab	Matrix	Depth	Date	Time	Qty	Lab
B1 (7-9)	Grab	SS		3/13/18	8:24	1	✓
B2 (6-8)					9:57	1	✓
B3 (3-5)					10:21	1	✓
B4 (3-5)					10:59	1	✓
B5 (1-3)					11:18	1	✓
B6 (1-3)					11:37	1	✓

* Matrix
SS - Soil AIR Air F Filter
GW - Groundwater B - Borehole
WW - Wastewater
DW - Drinking Water
OT - Other

Remarks:

Handwritten: **USE MONITOR Units + Methods**

Samples returned via
UPS FedEx Courier **7 SUR**

Tracking #

Received by (Signature)
Sam Perle 3/13/18 1:32

Received by (Signature)
Monoh L. Hoya

Initial Blank Received: Yes ☒ No ☐
HCL / Mechl
Tab

Temp: 24°C
Time: 10:10

Lab: 3/14/18 1400

Sample Received: Checksum
Can Seal Present/Intact: ☒ ☐
Can Sealed/Accurate: ☒ ☐
Bottle Leaks (Inlet): ☒ ☐
Correct bottles used: ☒ ☐
Sufficient volume used: ☒ ☐
If Applicable
VQA Zero Read/Blank: ☒ ☐
In preservation: Correct/Checked: ☒ ☐

If preservation required by Log: Date/Time

Received by (Signature)

Date

Time

Received by (Signature)

Lab

Time

Field

Condition
NCF / OK

UES Consulting Services
100 E 7th Street, Suite 200
Kansas City, MO 64106
Phone: 816-221-0627
Fax: 816-221-0628

ESC

1977312
H070

Account: **UNDERMO**

Template:

Prelogin:

TSR:

PB:

Shipped Via

Appendix C

JB**Environmental**

LOG OF TEST BORING

DATE 3/13/18 WELL NO. B1BORING NO. _____ SHEET 1 of 1

PROJECT NAME _____

PROJECT LOCATION _____

CONSULTANT UES Consulting SerGEOLOGIST James BurkeGROUND COVER TYPE Concrete

DRILLER/HELPER _____

DRILLING METHOD HSA

HSA: _____

SFA: XSAMPLING METHOD: 5'CSS

10 1/2" ID x 8 1/4" OD

8 1/2" OD x 4 1/4" ID

7 1/2" OD x 3 1/4" ID

4 1/2" OD X

6 1/2" OD

8 1/2" OD

DEPTH (FEET)	NO	SAMPLE/TEST TYPE	RECOVERY	SOIL DESCRIPTION (USC SYSTEM)	NOTES
5'				concrete concrete, limestone rock fill, loose dry, no odor	B1
10'				tan loess, soft, moist, no odor	SLT-9)
				B.D.H. 10'	
				plugged w/ bentonite concrete at surface	
				Job Contact # Arthur 816-876-8682	

WELL COMPLETION INFORMATION

2" - 4" PVC screen length _____ slot size _____

2" - 4" PVC riser length _____

3/4" - 4" Expanding plug

Colorado Silica Sand (10-20) from _____ to _____

Bentonite from _____ to _____

JB Environmental

LOG OF TEST BORING

DATE 3/13/18 WELL NO. B2
BORING NO. _____ SHEET 1 of 1

PROJECT NAME _____

PROJECT LOCATION 303 Broadway, Kansas City, MoCONSULTANT UES Consulting SerGEOLOGIST James BeckerGROUND COVER TYPE Concrete

DRILLING METHOD HSA: _____

SFA: X

DRILLER/HELPER _____

SAMPLING METHOD: SCSS _____

10 1/2" ID x 6' 4" OD _____

8 1/2" OD x 4' 4" ID _____

7 1/2" OD x 3' 4" ID _____

4' 4" OD X

6' 4" OD _____

8' 4" OD _____

DEPTH (FEET)	SAMPLE/TEST			SOIL DESCRIPTION (USC SYSTEM)	NOTES
	NO	TYPE	RECOVERY		
6'				Concrete concrete rubble, limestone, few red bricks, well, loose, dry, no steel	B2
				Br silty loess, damp, no steel soft	sl. 6'-8')
				B.D.H 8'	
				plugged w/ bentonite concrete at surface	

WELL COMPLETION INFORMATION

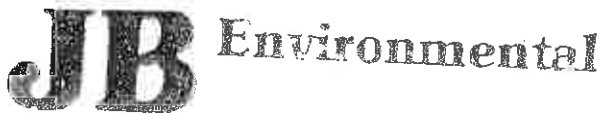
2" - 4" PVC screen length: _____ slot size: _____

2" - 4" PVC riser length: _____

3/4" - 4" Expanding plug

Colorado Silica Sand (10-20) from _____ to _____

Bentonite from _____ to _____



LOG OF TEST BORING

DATE 3/13/18 WELL NO B3BORING NO. _____ SHEET 1 OF 1

PROJECT NAME _____

PROJECT LOCATION: 303 Broadway, Kansas City, Mo.CONSULTANT UES Consulting Ser.GEOLOGIST James BuekerGROUND COVER TYPE concrete

DRILLER/HELPER _____

DRILLING METHOD HSASFA: XSAMPLING METHOD: 5'CS3

10 1/2" ID x 6 1/4" OD

6 1/2" OD x 4 1/4" ID

7 1/2" OD x 3 1/4" ID

4 1/4" OD X

6 1/2" OD

6 1/4" OD

DEPTH (FEET)	SAMPLE/TEST			SOLID DESCRIPTION (USC SYSTEM)	NOTES
	NO.	TYPE	RECOVERY		
5				<u>Concrete</u> <u>concrete, limestone rx, red brick</u> <u>rubble full, drip, loose, no adhesion</u>	<u>B3</u>
				<u>massive con. silt, loose, slight adhesion</u> <u>app.</u>	<u>(7-9)</u>
				<u>B.O.H. 10'</u>	
				<u>plugged w/ bentonite</u> <u>concrete at surface</u>	

WELL COMPLETION INFORMATION

2" - 4" PVC screen length _____ slot size _____

2" - 4" PVC riser length _____

2" - 4" Expanding plug

Colorado Silice Sand (10-20) from _____ to _____

Bentonite from _____ to _____

JB Environmental

LOG OF TEST BORING

DATE 3/13/18 WELL NO. B4BORING NO. _____ SHEET 1 of 1

PROJECT NAME _____

PROJECT LOCATION 303 Broadway; Kansas City, Mo.CONSULTANT UES Consulting SLL GEOLOGIST James BuekerGROUND COVER TYPE Concrete DRILLER/HELPER _____DRILLING METHOD HSA: _____ SFA: X SAMPLING METHOD: 5'CS8 _____10 1/2 ID x 6 1/4 OD _____ 6 1/2 OD x 4 1/4 ID _____ 7 1/2 OD x 3 1/4 ID _____ 4 1/2 OD X 6 1/4 OD _____ 6 1/2 OD _____

DEPTH (FEET)	SAMPLE/TEST		BOUD DESCRIPTION (USC SYSTEM)	NOTES
	NO	TYPE RECOVERY		
			<u>Concrete</u>	<u>B4</u>
			<u>Brn clay w/ red bricks, loose, dry</u>	
			<u>faint odor</u>	
<u>5'</u>			<u>Brn clay w/ few red brick fragments</u>	<u>5(3-5)</u>
			<u>Hard, soft, no to faint odor</u>	
			<u>B.O.H. 5'</u>	
			<u>plugged w/ bentonite</u>	
			<u>concrete at surface</u>	

WELL COMPLETION INFORMATION

2" - 4" PVC screen length _____ slot size _____

2" - 4" PVC riser length _____

2" - 4" Expanding plug

Colorado Silica Sand (10-20) from _____ to _____

Bentonite from _____ to _____

JB Environmental

LOG OF TEST BORING

DATE 3/13/18 WELL NO. B5BORING NO. _____ SHEET 1 OF 1

PROJECT NAME _____

PROJECT LOCATION 303 Broadway, Kansas City, MoCONSULTANT UES Consulting Ser GEOLOGIST James BurkeGROUND COVER TYPE Concrete DRILLER/HELPER _____DRILLING METHOD HSA: _____ SFA: X SAMPLING METHOD: Hard Auger10 1/2 ID x 6 1/4 OD _____ 8 1/2 OD x 4 1/4 ID _____ 7 1/2 OD x 3 1/4 ID _____ 4 1/2 OD X 6 1/2 OD _____ 8 1/2 OD _____

DEPTH (FEET)	NO	SAMPLE/TEST TYPE RECOVERY	SOIL DESCRIPTION (USC SYSTEM)	NOTES
			<u>Concrete</u>	<u>B5</u>
			<u>grayish brown silty clay w/ few large concrete pebbles, soft, no odor</u>	<u>50-53)</u>
			<u>B.O.H. 3'</u>	
			<u>plugged w/ concrete</u>	

WELL COMPLETION INFORMATION

2" - 4" PVC screen length _____ slot size _____

2" - 4" PVC riser length _____

2" - 4" Expanding plug

Colorado Silica Sand (10-20) from _____ to _____

Bentonite from _____ to _____

JB Environmental

LOG OF TEST BORING

DATE 3/13/18 WELL NO. B6BORING NO. _____ SHEET 1 OF 1

PROJECT NAME _____

PROJECT LOCATION 303 Broadway; Kansas City, Mo.CONSULTANT UES Consulting Svc GEOLOGIST James BuehlGROUND COVER TYPE Concrete DRILLER/HELPER _____DRILLING METHOD HSA: _____ SFA: _____ SAMPLING METHOD: SCSS Hand Auger

10 1/2" ID x 8' 4" OD _____ 8 1/2" OD x 4' 4" ID _____ 7 1/2" OD x 3' 4" ID _____ 4' 4" OD _____ 5' 4" OD _____ 6' 4" OD _____

DEPTH (FEET)	SAMPLE/TEST			BOLD DESCRIPTION (USC SYSTEM)	NOTES
	NO	TYPE	RECOVERY		
				<u>Concrete</u>	<u>B6</u>
				<u>Bm silty clay, lots w/ few lvs rx,</u>	<u>2(1-3)</u>
				<u>concrete pebbles, dry to damp,</u>	
				<u>full, faint color</u>	
				<u>B.O.H. 3'</u>	
				<u>plugged w/concrete</u>	

WELL COMPLETION INFORMATION

2" - 4" PVC screen length _____ slot size _____

2" - 4" PVC riser length _____

2" - 4" Expanding plug

Colorado Silica Sand (10-20) from _____ to _____

Bentonite from _____ to _____

Appendix D

Samuel E. Petrie, P.E.
Engineering and Project Manager

Professional Licenses/Registrations

Professional Engineering: KS, 1997; MO, 2009; NE, 2011
Cert Inspection/Management Planning for Asbestos Control: MO, 1995
Certified OSHA 29 CFR1910.120(e) Supervisor, 1991
Risk Assessment Guidance for Superfund (165.6)
General/Residential Contractor Licensed/Registered in over 25 States

Professional Memberships

Air & Waste Management Association

Education

Master of Science, 1989
Business Administration
University of Kansas

Bachelor of Science, 1984
Chemical Engineering
University of Kansas

Project Experience

As a member of George Butler Associates, Inc. (GBA) environmental staff and Emerald Environmental, LLC, Sam Petrie has focused on Phase I environmental site assessments (ESAs), site investigations of underground storage tank (UST) sites, feasibility studies, and the design of solutions to hazardous waste and petroleum contamination problems. Sam's strong background in chemical engineering allows him to evaluate a variety of contaminants such as inorganics, organics, herbicides, pesticides, PCBs, asbestos, and lead based paint. He is responsible for analyzing the nature and extent of potential contamination of a site, including contaminant fate and transport, as well as risk assessment. He has served as a Site Safety officer for various projects and has implemented Site, Health, and Safety plans for hazardous waste sites in Kansas and Missouri. Sam has performed hundreds of environmental site assessments and worked with numerous underground storage tank sites, since 1991. Prior to 1991, Sam's experience involved wastewater facilities design and equipment sales. His related project experience includes:

- Prepared a Remedial Investigation Feasibility Study for the City of Kansas City, Missouri. The study evaluated the potential contamination of the soil, sediment, surface water and bioaccumulation of chlordane and RCRA metals in order to determine the feasible uses of the property under investigation.
- Final design of groundwater remediation systems for the recovery of Light and Dense Non-Aqueous Phase Liquids (LNAPLs and DNAPLs) from shallow aquifers for the U.S. Penitentiary in Leavenworth, Kansas; the Kansas City, Missouri Water Services Department; and a private industrial client. Interaction with MDNR and Kansas Department of Health and Environment (KDHE) State regulatory agencies was required.

Samuel E. Petrie, P.E.
Engineering and Project Manager

- Prepared a Preliminary Site Investigation Report for the Department of Justice in the Midwest to determine the presence and extent of soil, sediment, and groundwater contamination along with bioaccumulation which included inorganics and organic compounds.
- Performed Phase I and Phase II Environmental Site Assessment of a 6-acre urban redevelopment project for large Federal Complex in Kansas City, Missouri. The purpose of the project was to conduct a Phase I and Phase II Environmental Site Assessment to identify and quantify potential environmental conditions associated with existing developed properties including a hospital, medical offices, school, parking structures and several commercial properties. The Phase I evaluation of the project area included the identification petroleum and hazardous substances, hazardous and solid waste, landfills, wells, underground and aboveground storage tanks, asbestos-containing materials, PCB's, and other environmental concerns. The Phase II evaluation included the quantification of Freon, PCB and mercury-containing equipment, an asbestos survey of all the project area structures, sampling of medical waste incinerators and soil sampling and a ground penetrating radar survey in the area of reported underground storage tanks.
- UST closures, site characterization and corrective action remediation and disposal design of soil and groundwater contamination from over 100 USTs containing kerosene, diesel, unleaded gasoline, and waste oil for Kansas City, Missouri. Preparation and Review 100s of Spill Prevention Control and Countermeasure (SPCC) plans for Aboveground Storage Tank (AST) facilities.

As a member of UES Consulting Service, Inc. (UES) engineering and project management staff, Sam Petrie has focused on hundreds of Phase I, II, and III environmental site assessments (ESAs), asbestos surveys, site investigations and removal of numerous underground storage tank (UST) sites, feasibility studies, and the design of solutions to hazardous waste, chlorinated hydrocarbons (dry cleaner facilities), and petroleum contamination problems. Sam has also developed scopes of work for asbestos surveys and subsurface soil, groundwater, vapor intrusion investigations and barriers, and other environmental tasks. Sam provides engineering project and construction management on all phases of site assessments, remediation, and property condition assessments for commercial and multi-family developments. Duties have included determination of current condition, immediate and long-term needs, building code compliance, and environmental compliance audits. Sam's diversified engineering and project management experience along with licensing/registration as a general/residential contractor in over 25 States provides engineering economic analysis and commercial construction management in both light and heavy commercial construction along with residential construction and rehabilitation.

Figure 1

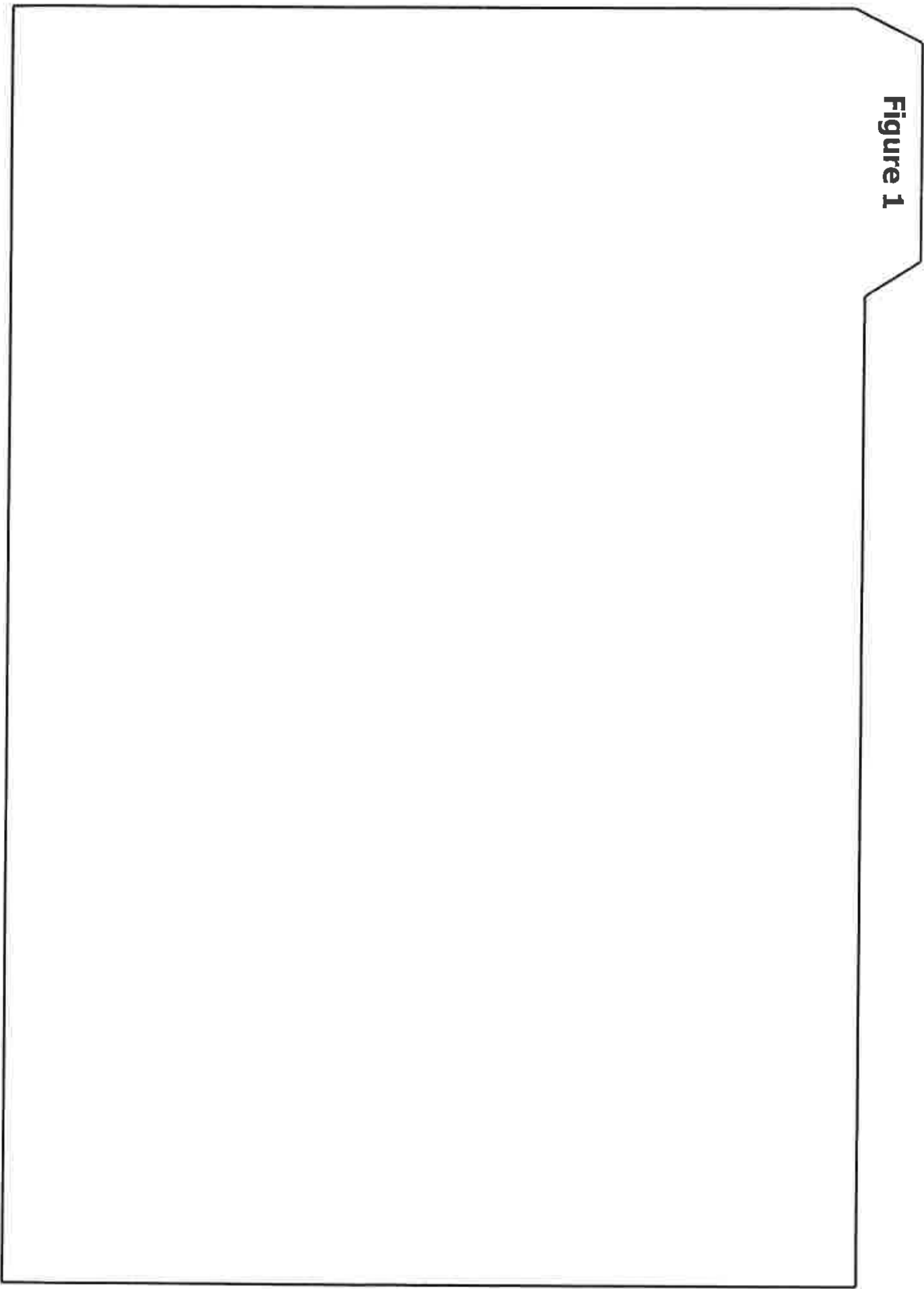




Figure 1. Site Sampling Plan

Location: 303 Broadway
Kansas City, Missouri

Project No. 3519.18

Drawn: GCP Ckd: SEP

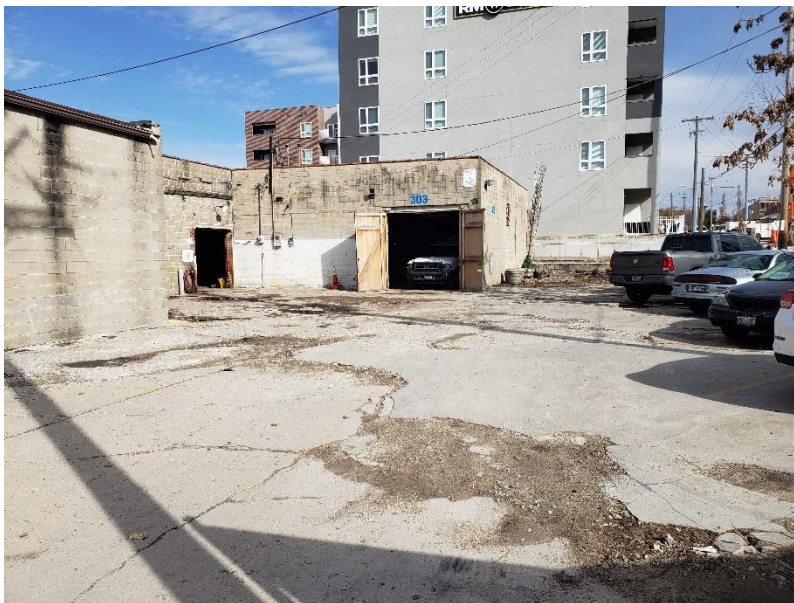
Date: 3/23/2018

Revisions:

**UES CONSULTING
SERVICES, INC.**

APPENDIX C
PHOTOGRAPHIC LOG

**Shostak Metal
Kansas City, Missouri**



TETRA TECH PROJECT NO. 103X9025160104.005 Direction: Northeast	DESCRIPTION	This photograph shows the south side of the site building, the south and east facing garages, and parking area.	1
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	L. Holt	11/1/2018



TETRA TECH PROJECT NO. 103X9025160104.005 Direction: Southeast	DESCRIPTION	This photograph shows the west facing garage entrances to the site property.	2
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	L. Holt	11/1/2018

**Shostak Metal
Kansas City, Missouri**



TETRA TECH PROJECT NO. 103X9025160104.005 Direction: North	DESCRIPTION	This photograph shows east side of the property and east adjoining apartment building.	3
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	L. Holt	11/1/2018



TETRA TECH PROJECT NO. 103X9025160104.005 Direction: South	DESCRIPTION	This photograph shows the pet relief area north of the site property.	4
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	L. Holt	11/1/2018

**Shostak Metal
Kansas City, Missouri**



<p>TETRA TECH PROJECT NO. 103X9025160104.005</p> <p>Direction: Northeast</p>	DESCRIPTION	This photograph shows the grassy area north of the site behind the Market Station Apartments building and south of the Union Pacific Railroad.	5
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	L. Holt	11/1/2018



<p>TETRA TECH PROJECT NO. 103X9025160104.005</p> <p>Direction: Northwest</p>	DESCRIPTION	This photograph shows the current state of commercial development on the previously vacant lot southeast of the site.	6
	CLIENT	U.S. Environmental Protection Agency Region 7	Date
	PHOTOGRAPHER	L. Holt	11/1/2018